Syllabus for LIN 637

Computational Linguistics 2 – Spring 2022

TTh 09:45-11:05, SBS N103

Last Updated: January 24, 2022

Course Website: https://github.com/Compling2-Spring2022-SBU/main

(clickable)

1 Course Outline

1.1 Description

This course is an introduction to the theoretical foundation of computational linguistics. The course emphasizes the importance of algorithms, recursive data structures, formal language theory, algebra and logic for understanding natural language and the development of new tools and software applications. Empirical phenomena in phonology and syntax are sampled from a variety of languages to motivate and illustrate the use of concepts such as strictly local string languages and functions, and different kinds of finite-state automata for strings and trees. Students will develop familiarity with the literature and tools of the field.

The course also serves as a bridge from introductory courses in linguistics (Syntax 1, Phonology 1, Phonetics) and computational methods (Statistics, Mathematical Methods in Linguistics, Computational Linguistics 1) to advanced courses and seminars in computational/mathematical linguistics. In contrast to the NLP courses offered by the department of computer science, this course focuses on studying the properties of natural language from a computationally informed perspective. The question is not how computers can solve language-related tasks, but how language can be conceptualized as a computational problem. This emphasis is also reflected in the selection of topics for this course.

1.2 List of topics

- *Formal Grammars and Languages*

  - The how what and why of formalization
  - Recursive structures

- *Strings for phonology and morphology*

  - String languages
  - String transductions

- – Regular, Rational, and Subregular classes
- – Algebraic and logical perspectives thereof

- *Trees for syntax and morphology*

    - – Tree languages
    - – Rational tree languages
    - – Tree transductions
    - – Subregular tree languages and transductions

- *Haskell*

    - – Functional programming
    - – Fully typed
    - – Lazy evaluation
    - – Think different!

1.3   Prerequisites

The only official prerequisite is Computational Linguistics 1 (Lin 537) or prior programming experience.

2   Graded Component

- **Homework**

    - – Approximately 10-12 exercises, including programming assignments.
    - – Homework submission and grading is done via github.
    - – Collaboration on homework problems is encouraged as long as the solution you turn in is completed by yourself, using your own words, examples, notation, and code.
    - – 2/3 of final grade

- **Project**

    - – You will develop a final project in this class
    - – Projects include theoretical research, program/software/tool development, or a software-aided study of language data.
    - – A one page project proposal is due Friday April 8.
    - – The project itself is due on Friday May 14.
    - – 1/3 of final grade

- **Readings**

    - – Readings will be given regularly and made available on the course website or by email.
    - – It is presupposed in the lectures that you have done the required readings.

- **Workload per Credits**

  - *0 credits*: attend (but I highly recommend that you at least read the assigned papers as they will be important for following the lectures)
  - *1 credit*: attend, participate, readings,
  - *2 credits*: attend, participate, readings, homework
  - *3 credits*: attend, participate, readings, homework, project

University Policies and Services

Student Accessibility Support Center Statement If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact the Student Accessibility Support Center, Stony Brook Union Suite 107, (631) 632-6748, or at `sasc@stonybrook.edu`. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and the Student Accessibility Support Center. For procedures and information go to the following website: `https://ehs.stonybrook.edu/ /programs/fire-safety/emergency-evacuation/evacuation-guide-disabilities` and search Fire Safety and Evacuation and Disabilities.

Academic Integrity Statement Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website at `http://www.stonybrook.edu/commcms/ academic_integrity/index.html`

Critical Incident Management Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Student Conduct and Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Until/unless the latest COVID guidance is explicitly amended by SBU, during Spring 2022 "disruptive behavior" will include refusal to wear a mask during classes.